IN THE CLAIMS

The following is a complete listing of claims with a status identifier in parenthesis.

LISTING OF CLAIMS

1. (Original) A method for calculating a transmission characteristic threshold for use in assigning a user to one layer in a plurality of layers in a wireless communications network, said method comprising:

calculating a first balancing metric based on an operating characteristic of said first layer;

calculating a second balancing metric based on an operating characteristic of said second layer; and

adjusting said transmission characteristic threshold in response to the value of said first balancing metric relative to said second balancing metric.

2. (Original) The method of claim 1 further comprising the step of assigning said user to a layer in response to the value of a first user transmission characteristic of a transmission from said user relative to said adjusted transmission characteristic threshold.

3. (Original) The method of claim 1, wherein said transmission characteristic threshold is a threshold corresponding to the size of the data to be transmitted to or from said user.

4. (Original) The method of claim 3 wherein said threshold is adjusted according to the equation:

$$D_0[k] = \min\left\{\max\left\{D_{\min}, D_0[k-1] - \frac{\beta_d}{k^{\gamma_d}}\Delta[k]\right\}, D_{\max}\right\}$$

where $D_0[k]$ is an optimal data size threshold at the k-th update interval of said threshold; β_d is an update magnitude parameter; γ_d is a time discounting factor; $D_0[k\text{-}1]$ is a data size threshold used at the k-1 update interval; $\Delta[k]$ is a weighted moving average of previous values of a difference in said balancing metric between the macro-cell layer and the micro-cell layer; $D_{\min}$ is the minimum data amount to be transmitted by any user in the user population; and $D_{\max}$ is a maximum possible data size corresponding to said user.

5. (Original) The method of claim 1 wherein said transmission characteristic threshold is a threshold corresponding to the velocity of said user.

6. (Original) The method of claim 5 wherein said threshold is adjusted according to the equation:

$$V_0[k] = \min\left\{\max\left\{V_{\min}, V_0[k-1] + \frac{\beta_v}{k^{\gamma_v}}\Delta[k]\right\}, V_{\max}\right\}$$

where $V_0[k]$ is an optimal velocity threshold at the k-th update interval of said threshold; β_v is an update magnitude parameter; γ_v is a time discounting factor; $V_0[k-1]$ is a velocity threshold used at the k-1 update interval; $\Delta[k]$ is a weighted moving average of previous values of a difference in said balancing metric between the macro-cell layer and the micro-cell layer; $V_{\min}$ is the minimum velocity of any user in the user population; and $V_{\max}$ is the maximum velocity corresponding to said user.

7. (Original) The method of claim 1 wherein said first operating characteristic corresponds to an average number of users.

8. (Original) The method of claim 1 wherein said first operating characteristic corresponds to the expected system load as seen by said user.

9. (Original) The method of claim 7 wherein said first balancing metric is determined by the expression $X_m = \frac{C_m - \lambda_m \bar{D}_m}{\sqrt{C_m}}$ and said second balancing metric is determined by the expression $X_\mu = \frac{C_\mu - \lambda_\mu \bar{D}_\mu}{\sqrt{C_\mu}}$.

10. (Original) The method of claim 8 wherein said first balancing metric is determined by the expression $X_m = \frac{\lambda_m \bar{D}_m}{C_m - \lambda_m \bar{D}_m}$ and the second balancing metric is determined by the expression $X\mu = \frac{\lambda_\mu \bar{D}_\mu}{C_\mu - \lambda_\mu \bar{D}_\mu}$.

11. (Original) The method of claim 8 wherein said first balancing metric is determined by calculating the number of users in the first layer of said network and said second balancing metric is determined by calculating the number of users in said second layer of said network.

12. (Original) Apparatus for calculating a transmission characteristic threshold for use in assigning a user to one layer in a plurality of layers in a wireless communications network, said apparatus comprising:

means for calculating a first balancing metric based on an operating characteristic of said first layer;

means for calculating a second balancing metric based on an operating characteristic of said second layer; and

means for adjusting said transmission characteristic threshold in response to the value of said first balancing metric relative to said second balancing metric.

13. (Original) The apparatus of claim 12 further comprising means for assigning said user to a layer in response to the value of a first user transmission characteristic of a transmission from said user relative to said adjusted transmission characteristic threshold.

14. (Original) The apparatus of claim 12, wherein said transmission characteristic threshold is a threshold corresponding to the size of the data to be transmitted to or from said user.

15. (Original) The apparatus of claim 14 wherein said threshold is adjusted according to the equation:

$$D_0[k] = \min\left\{\max\left\{D_{\min}, D_0[k-1] - \frac{\beta_d}{k^{\gamma_d}}\Delta[k]\right\}, D_{\max}\right\}$$

where $D_0[k]$ is an optimal data size threshold at the k-th update interval of said threshold; β_d is an update magnitude parameter; γ_d is a time discounting factor; $D_0[k\text{-}1]$ is a data size threshold used at the k-1 update interval; $\Delta[k]$ is a weighted moving average of previous values of a difference in said balancing metric between the macro-cell layer and the micro-cell layer; $D_{\min}$ is the minimum data amount to be transmitted by any user in the user population; and $D_{\max}$ is a maximum possible data size corresponding to said user.

16. (Original) The apparatus of claim 12 wherein said transmission characteristic threshold is a threshold corresponding to the velocity of said user.

17. (Original) The apparatus of claim 16 wherein said threshold is adjusted according to the equation:

$$V_0[k] = \min\left\{\max\left\{V_{\min}, V_0[k-1] + \frac{\beta_v}{k^{\gamma_v}}\Delta[k]\right\}, V_{\max}\right\}$$

where $V_{v[k]}$ is an optimal velocity threshold at the k-th update interval of said threshold; β_v is an update magnitude parameter; γ_v is a time discounting factor; $V_0[k-1]$ is a velocity threshold used at the k-1 update interval; $\Delta[k]$ is a weighted moving average of previous values of a difference in said balancing metric between the macro-cell layer and the micro-cell layer; $V_{\min}$ is the minimum velocity of any user in the user population; and $V_{\max}$ is the maximum velocity corresponding to said user.

18. (Original) The apparatus of claim 12 wherein said first operating characteristic corresponds to an average number of users.

19. (Original) The apparatus of claim 12 wherein said first operating characteristic corresponds to the expected system load as seen by said user.

20. (Original) The apparatus of claim 18 wherein said first balancing metric is determined by the expression $X_m = \frac{C_m - \lambda_m \bar{D}_m}{\sqrt{C_m}}$ and said second balancing metric is determined by the expression $X_\mu = \frac{C_\mu - \lambda_\mu \bar{D}_\mu}{\sqrt{C_\mu}}$.

21. (Original) The apparatus of claim 18 wherein said first balancing metric is determined by the expression $X_m = \frac{\lambda_m \bar{D}_m}{C_m - \lambda_m \bar{D}_m}$ and the second balancing metric is determined by the expression $X\mu = \frac{\lambda_\mu \bar{D}_\mu}{C_\mu - \lambda_\mu \bar{D}_\mu}$.

22. (Original) The apparatus of claim 18 wherein said first balancing metric is determined by calculating the number of users in the first layer of said network and said second balancing metric is determined by calculating the number of users in said second layer of said network.

23. (Original) An assignment manager for assigning a user to one layer in a plurality of layers in a wireless communications network, said assignment manager comprising:

a first circuit for calculating a first balancing metric based on an operating characteristic of said first layer;

a second circuit for calculating a second balancing metric based on an operating characteristic of said second layer; and

a third circuit for adjusting a transmission characteristic threshold in response to the value of said first balancing metric relative to said second balancing metric.

24. (Original) The assignment manager of claim 23 wherein said first circuit, said second circuit, said third circuit and said fourth circuit are the same circuit.

25. (Original) The assignment manager of claim 23 further comprising a fourth circuit for assigning said user to a layer in response to the value of a first

user transmission characteristic of a transmission from said user relative to said adjusted transmission characteristic threshold.

26. (Original) The assignment manager of claim 23 wherein said first circuit, said second circuit, said third circuit and said fourth circuit are the same circuit.

27. (Original) The method of claim 23, wherein said transmission characteristic threshold is a threshold corresponding to the size of the data to be transmitted to or from said user.

28. (Original) The assignment manager of claim 27 wherein said threshold is adjusted according to the equation:

$$D_0[k] = \min\left\{\max\left\{D_{\min}, D_0[k-1] - \frac{\beta_d}{k^{\gamma_d}}\Delta[k]\right\}, D_{\max}\right\}$$

where $D_0[k]$ is an optimal data size threshold at the k-th update interval of said threshold; β_d is an update magnitude parameter; γ_d is a time discounting factor; $D_0[k\text{-}1]$ is a data size threshold used at the k-1 update interval; $\Delta[k]$ is a weighted moving average of previous values of a difference in said balancing metric between the macro-cell layer and the micro-cell layer; $D_{\min}$ is the minimum data amount to be transmitted by any user in the user population; and $D_{\max}$ is a maximum possible data size corresponding to said user.

29. (Original) The assignment manager of claim 23 wherein said transmission characteristic threshold is a threshold corresponding to the velocity of said user.

30. (Original) The assignment manager of claim 29 wherein said threshold is adjusted according to the equation:

$$V_0[k] = \min\left\{\max\left\{V_{\min}, V_0[k-1] + \frac{\beta_v}{k^{\gamma_v}}\Delta[k]\right\}, V_{\max}\right\}$$

where $V_{o[k]}$ is an optimal velocity threshold at the k-th update interval of said threshold; β_v is an update magnitude parameter; γ_v is a time discounting factor; $V_0[k-1]$ is a velocity threshold used at the k-1 update interval; $\Delta[k]$ is a weighted moving average of previous values of a difference in said balancing metric between the macro-cell layer and the micro-cell layer; $V_{\min}$ is the minimum velocity of any user in the user population; and $V_{\max}$ is the maximum velocity corresponding to said user.

31. (Original) The assignment manager of claim 23 wherein said first operating characteristic corresponds to an average number of users.

32. (Original) The assignment manager of claim 23 wherein said first operating characteristic corresponds to the expected system load as seen by said user.

33. (Original) The assignment manager of claim 31 wherein said first balancing metric is determined by the expression $X_m = \frac{C_m - \lambda_m \bar{D}_m}{\sqrt{C_m}}$ and said second balancing metric is determined by the expression $X_\mu = \frac{C_\mu - \lambda_\mu \bar{D}_\mu}{\sqrt{C_\mu}}$.

34. (Original) The assignment manager of claim 32 wherein said first balancing metric is determined by the expression $X_m = \frac{\lambda_m \bar{D}_m}{C_m - \lambda_m \bar{D}_m}$ and the second balancing metric is determined by the expression $X\mu = \frac{\lambda_\mu \bar{D}_\mu}{C_\mu - \lambda_\mu \bar{D}_\mu}$.

35. (Original) The assignment manager of claim 32 wherein said first balancing metric is determined by calculating the number of users in the first layer of said network and said second balancing metric is determined by calculating the number of users in said second layer of said network.

36. (Original) The assignment manager of claim 23 wherein said first circuit, said second circuit, said third circuit and said fourth circuit are the same circuit.